

WHAT IS CLAIMED IS:

1. A semiconductor power module comprising:

(a) a ceramic substrate;

(b) a metallic plate bonded to a surface of said substrate;

5 (c) a cylindrical metallic flange which is hermetically bonded to said substrate at an outer circumference of said substrate, separated from said metallic plate;

(d) a disk-shaped ceramic housing for hermetically sealing an opening of said metallic flange; and

10 (e) at least one or more semiconductor chips mounted on and soldered to said metallic plate.

2. The semiconductor power module of claim 1, wherein an annular metallic member is bonded to an outer circumference of said ceramic housing, and an end of said metallic member is bonded to an open end of said metallic flange with a welding.

3. The semiconductor power module of claim 1, wherein bottom surface of said semiconductor chip and said metallic flange are electrically connected to each other through said metallic plate.

4. The semiconductor power module of claim 1, wherein an electrode path is formed by pressure-contacting a conductive electrode pedal to an electrode pad disposed on said semiconductor chip.

5. The semiconductor power module of claim 4, wherein in said ceramic housing, said conductive electrode pedal is pressure-contacted to said semiconductor chip through a pressure applied by a spring.

6. The semiconductor power module of claim 1, wherein said metallic flange is a metal having a small thermal expansion coefficient.

7. The semiconductor power module of claim 1, wherein said semiconductor chip is IGBT.

8. A semiconductor power module comprising:

(a) a ceramic substrate;
(b) a metallic plate bonded to a surface of said substrate;
(c) a cylindrical metallic flange which is hermetically bonded to a surface of said metallic plate at a boundary of said metallic plate;
5 (d) a disk-shaped ceramic housing for hermetically sealing an opening of said metallic flange; and
(e) at least one or more semiconductor chips mounted on and soldered to said metallic plate.

10 9. The semiconductor power module of claim 8, wherein an annular metallic member is bonded to an outer circumference of said ceramic housing, and an end of said metallic member is bonded to an open end of said metallic flange with a welding.

15 10. The semiconductor power module of claim 8, wherein bottom surface of said semiconductor chip and said metallic flange are electrically connected to each other through said metallic plate.

20 11. The semiconductor power module of claim 8, wherein an electrode path is formed by pressure-contacting a conductive electrode pedal to an electrode pad disposed on said semiconductor chip.

25 12. The semiconductor power module of claim 11, wherein in said ceramic housing, said conductive electrode pedal is pressure-contacted to said semiconductor chip through a pressure applied by a spring.

13. The semiconductor power module of claim 8, wherein said metallic flange is a metal having a small thermal expansion coefficient.

30 14. The semiconductor power module of claim 8, wherein said semiconductor chip is IGBT.

15. A large scale module comprising:

35 (a) a heat sink;
(b) a metallic frame having a plurality of openings disposed on said heat sink;

(c) a plurality of semiconductor power modules disposed on said heat sink so as to be mounted in said openings;

(d) a plurality of sealing members disposed between said respective semiconductor power modules and said metallic frame;

5 (e) a plastic cover for covering one surface of said metallic frame on which said semiconductor power module is mounted; and

(f) a resin filled into said cover.

10 16. The large scale module of claim 15, wherein respective electrodes of said semiconductor power module are connected in parallel or in series and connected to outer electrodes disposed on a top surface of said cover.

17. The large scale module of claim 15, wherein a second surface opposite to a first surface attached to the heat sink is covered by said plastic cover.

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18. The large scale module of claim 15, wherein said semiconductor power module comprising:

(a) a ceramic substrate;

(b) a metallic plate bonded to a surface of said substrate;

20 (c) a cylindrical metallic flange which is hermetically bonded to said substrate at an outer circumference of said substrate, separated from said metallic plate;

(d) a disk-shaped ceramic housing for hermetically sealing an opening of said metallic flange; and

25 (e) at least one or more semiconductor chips mounted on and soldered to said metallic plate.

19. The large scale module of claim 15, wherein said semiconductor power module comprising:

30 (a) a ceramic substrate;

(b) a metallic plate bonded to a surface of said substrate;

(c) a cylindrical metallic flange which is hermetically bonded to a surface of said metallic plate at a boundary of said metallic plate;

35 (d) a disk-shaped ceramic housing for hermetically sealing an opening of said metallic flange; and

(e) at least one or more semiconductor chips mounted on and soldered

to said metallic plate.